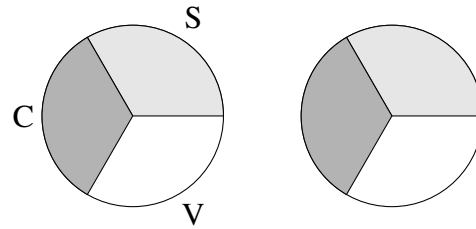


Goal: Review Divider-Chooser, motivate and introduce Lone-Divider

1. Recall from the previous worksheet: Tom and Fred were given a cake worth \$12 that is equal parts strawberry, vanilla and chocolate. Their respective values summarized in the chart.

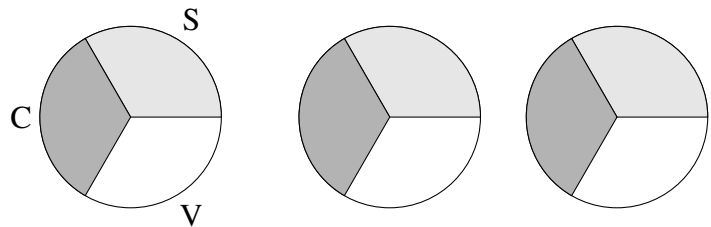
	vanilla	strawberry	chocolate
Tom	\$ 6	\$ 6	\$ 0
Fred	\$ 2	\$ 4	\$ 6



- (a) Divide the cake using Divider-Chooser assuming Tom is the divider. Determine the **value** of the assigned share to each party. Use the pictures of the cake (above) to draw the outcome.)

- (b) What happens if try to use Divider-Chooser with **three** people? (Try Fred as divider.)

	V	S	C
Tom	\$ 6	\$ 6	\$ 0
Fred	\$ 2	\$ 4	\$ 6
Mary	\$ 8	\$ 0	\$ 4



2. Why cake?

3. Lone-Divider Method (for N people with $N \geq 3$).

0. **Arbitrarily** pick a Divider.

1. Divider divides the items into N shares of equal value to them: s_1, s_2, \dots, s_N .

2. Remaining parties **declare** or **bid** on shares, s_1, s_2, \dots, s_N , they consider fair.

3. i. **IF** the N shares can be divided such that each all get a fair share, then do so.

ii. **IF NOT**, the Divider gets a **non-contested piece**. Remaining shares are recombined. Lone-Divider is restarted with $N - 1$ parties.

iii. If only 2 parties remain, use Divider-Chooser.

4. **Example 1** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 shares and their respective values are summarized in the table.

(a) What is a fair share? _____

	s_1	s_2	s_3
Patrick	\$50	\$150	\$100
Chris	\$70	\$70	\$160
Travis	\$100	\$100	\$100

(b) Circle or highlight each individual's **bid** (the shares they would consider to be fair).

(c) Determine which person was the Divider.

(d) Determine the next steps of the Lone-Divider Method.

5. **Example 2** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 (different) shares and their respective values are summarized in the table.

	t_1	t_2	t_3
Patrick	\$100	\$100	\$100
Chris	\$90	\$40	\$170
Travis	\$50	\$90	\$160

(a) Circle or highlight each individual's **bid** (the shares they would consider to be fair).

(b) Determine which person was the Divider.

(c) Determine the next steps of the Lone-Divider Method.